

Juniper and VMware NSX

Introducing network virtualization into software-defined data centers

Challenge

In increasingly virtualized data centers, physical networks impose limitations that prevent the rapid provisioning of network resources. As a result, the network has become a bottleneck that is not in alignment with the automated provisioning of virtual machines.

Solution

Juniper Networks, working in partnership with VMware, provides a seamless integrated network virtualization platform. By integrating Juniper switches with VMware's NSX platform, this joint solution delivers the same automated operational model as a virtual machine.

Benefits

- Deployable across existing physical infrastructure without disrupting production networks
- Ensures agility with VM mobility breaking across traditional Layer 2 boundaries
- Provides a single touchpoint for consistent automation across compute, virtual, and physical networks, reducing provisioning times from days to seconds
- Reduces day-to-day operational costs and increases overall productivity



Server virtualization has changed the way compute resources are consumed by data center applications. As data centers become increasingly virtualized, workloads are decoupled from physical servers through the use of hypervisors, allowing them to move freely among hosts wherever resources are available. This has revolutionized the way virtualized workloads are consumed, managed, and consolidated, resulting in considerable cost savings. The network, however, has not kept pace with the dramatic innovations that started with virtualization several years ago. Legacy virtual networks have become costly barriers to true elastic workload freedom within and between data centers, limiting the scale of secure isolated multitenant creation and preventing large-scale cloud deployments.

The Challenge

In order to reap the true value of a completely virtualized infrastructure, a virtual network must be completely decoupled from its underlying physical infrastructure. To enable true workload mobility, a virtual network must travel in lock-step with its workload, retaining crucial network information that will allow it to continue communicating with the rest of the data center.

To realize the full benefits of a software-defined solution, modern data centers must deliver:

- **Agility:** Virtual machines (VMs) must be able to freely cross traditional Layer 2 boundaries to enable true mobility within and across data centers.
- **Abstraction:** The virtual network must be entirely decoupled from the underlying physical infrastructure so that it does not become an obstacle to the dynamic provisioning of virtual networks on demand.
- **Layer 2 gateway capabilities:** The virtual infrastructure must be able to communicate with the physical infrastructure, translating virtual network traffic into physical network traffic (and vice versa) without impacting application performance.
- **Secure multitenancy:** The virtualized network must be able to secure and segregate tenants to ensure that applications are entirely isolated and secure.

The Juniper Networks and VMware NSX Joint Solution

Working together, Juniper Networks® and VMware offer a solution that brings network virtualization to software-defined data centers, helping bridge the gap between server virtualization and networking. Leveraging VMware's NSX platform, this joint solution allows compute and networking to move in lock-step as new workloads are dynamically provisioned. Through Virtual Extensible LAN (VXLAN), multitenancy can scale beyond the 4,096 VLAN ID barrier, enabling up to 16 million private networks scaling tenant creation to match the requirements of highly scalable and elastic cloud data centers. The provisioning of virtual networking is done in real time, accomplished in seconds rather than minutes or even days as in the past.



VMware NSX Platform

The VMware NSX platform implements a dynamic and agile overlay infrastructure that sits on top of the existing network, protecting investments in the physical infrastructure. Through the use of an NSX controller, the NSX virtualized platform enables VMs to cross traditional L2 VLAN boundaries by using VXLAN to create logical Layer 2 network segments. This enables dynamic and unrestricted workload mobility within the data center, ensuring that VMs best utilize host resources wherever they may be available. As VMs move around the data center, relevant profiles and policies such as virtual network and security profiles follow them, moving in lock-step to ensure consistency.

Juniper Networks Switching

Juniper has long been an industry leader in providing best-of-breed switching platforms that solve enterprise data center networking needs. Across 10/40/100GbE, Juniper offers a complete switching portfolio. Customers can select the right device from the Juniper Networks EX Series or QFX Series Ethernet Switch product lines to help them build a software-defined data center that meets their specific needs. Juniper switches easily bridge the gap between virtualized and physical data centers with minimal impact on daily operations.

Features and Benefits

Data Center Economics

The VMware NSX virtualization platform provides the foundation for building a software-defined data center (SDDC) that leverages data center virtualization to reduce costs. It also delivers greater business agility to help organizations achieve their business objectives. Seamless automation and nondisruptive deployment that bring together existing compute, network, and storage investments are the hallmark of an SDDC.

Bridging the Virtual and Physical Worlds: VXLAN Gateway

Not every host in every data center is completely virtualized; therefore, there needs to be a way for the virtualized world to communicate with the physical world that allows network traffic to reach the Internet. This is easily accomplished through a hardware virtual tunnel endpoint (VTEP) built into Juniper switches that can translate virtualized VXLAN traffic into physical network traffic at line rate, allowing scalable bidirectional traffic flows. This scalable translation prevents bottlenecks and guarantees consistent application performance that doesn't impact business productivity.

Single Touchpoint/Single Management

Virtualized network nodes are controlled through a single touchpoint via the VMware NSX controller, which creates a single management point across software and hardware VTEPs. Juniper switches register with the NSX controller and use Open vSwitch Database Management Protocol (OVSDDB)

to synchronize topology information, media access control (MAC)-to-VXLAN endpoint, and VXLAN ID binding with the NSX controller. The NSX controller programs switches as NSX hardware VTEP gateways, allowing nearly real-time synchronization of state between physical and virtual VXLAN tunnel endpoints during any network change or workload movement. This same provisioning mechanism programs quality-of-service (QoS) and security policies at the physical and virtual overlay edge.

Investment Protection

Constant change is the hallmark of technological innovation. Customers can't predict what the next data center technology will be. Enterprise customers want to preserve as much of their existing investments as possible while accommodating new technologies as they are introduced. An investment in Juniper switching platforms ensures that what is deployed today will successfully interoperate with other open, standards-based platforms in the future while accommodating new technologies and innovations as they come along—all while preserving today's capital investments.

High Availability Designs

Critical enterprise applications demand high availability across their underlying infrastructure. A single device failure cannot be allowed to impact existing enterprise applications that are critical in running the business. Highly regulated industries such as finance and healthcare require high availability designs to ensure that any failures will not have a ripple effect on the day-to-day use of their business-critical applications. Juniper Networks provides a variety of robust high availability fabrics that mitigate or even eliminate the risk of single points of failure by introducing layers of redundancy into network infrastructure designs.

Summary—Network Virtualization for Software-Defined Data Centers

Juniper Networks, working in partnership with VMware, provides a seamless integrated network virtualization platform. Juniper's data center switches are built for high availability, resilience, and performance, delivering the industry's most effective networking solutions. To ensure application resiliency, the network layer constructed by Juniper provides nonblocking active/active forwarding and redundancy with hitless failover in the unlikely event of a switch failure. In addition, Juniper networking solutions provide network virtualization hardware gateways that scale across 10/40/100GbE connectivity, providing terabytes of network capacity across a data center infrastructure.

Next Steps

To learn more about the Juniper-VMware NSX solution, please visit www.juniper.net, www.vmware.com, or contact your Juniper or VMware representative.

About VMware

VMware NSX is a multi-hypervisor network virtualization platform that delivers the operational model of a virtual machine for the network. Virtual networks reproduce the network model in software, allowing complex multitier network topologies to be created and provisioned programmatically in seconds. Similar to virtual machines in compute, virtual networks are programmatically provisioned and managed independent of networking hardware. Decoupling from hardware introduces agility, speed, and operational efficiency, and this has the power to transform data center economics.

About Juniper Networks

Juniper Networks challenges the status quo with products, solutions and services that transform the economics of networking. Our team co-innovates with customers and partners to deliver automated, scalable and secure networks with agility, performance and value. Additional information can be found at [Juniper Networks](#) or connect with Juniper on [Twitter](#) and [Facebook](#).

Corporate and Sales Headquarters

Juniper Networks, Inc.
1133 Innovation Way
Sunnyvale, CA 94089 USA
Phone: 888.JUNIPER (888.586.4737)
or +1.408.745.2000
Fax: +1.408.745.2100
www.juniper.net

APAC and EMEA Headquarters

Juniper Networks International B.V.
Boeing Avenue 240
1119 PZ Schiphol-Rijk
Amsterdam, The Netherlands
Phone: +31.0.207.125.700
Fax: +31.0.207.125.701



Copyright 2016 Juniper Networks, Inc. All rights reserved. Juniper Networks, the Juniper Networks logo, and Junos are registered trademarks of Juniper Networks, Inc. in the United States and other countries. All other trademarks, service marks, registered marks, or registered service marks are the property of their respective owners. Juniper Networks assumes no responsibility for any inaccuracies in this document. Juniper Networks reserves the right to change, modify, transfer, or otherwise revise this publication without notice.

JUNIPER
NETWORKS